AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1   1. (Currently amended) A method for temporarily increasing an operating
2   frequency of an electronic circuit beyond a maximum sustainable operating
3   frequency, comprising:
4   receiving a request for a higher operating frequency for the electronic
5   circuit from a controller that detects an increase in computational workload by
6   monitoring a current sensor within the computer system;
7   determining a thermal energy level of a cooling system for the electronic
8   circuit; and
9   if the thermal energy level is below a threshold level for a thermal capacity
10   of the cooling system, increasing the operating frequency of the electronic circuit
11   to a frequency that is greater than the maximum sustainable operating frequency
12   for a period of limited duration;
13   wherein the period of limited duration is short enough to ensure that a
14   temperature increase, caused by increasing the operating frequency, does not raise
15   an operating temperature of the electronic circuit above a maximum operating
16   temperature.

1   2. (Original) The method of claim 1, wherein the electronic circuit is a
2   computer system.

1   3. (Currently amended) The method of claim 2, ~~wherein~~ further

2   comprising receiving the request for the higher operating frequency ~~involves~~

3   ~~receiving the request~~ from one of:

4   an application running on the computer system; and

5   an operating system of the computer system~~; and~~

6   ~~a controller that detects an increase in computational workload by~~

7   ~~monitoring a current sensor within the computer system.~~

1   4. (Original) The method of claim 1, wherein measuring the thermal

2   energy level of the cooling system involves measuring a temperature of a heat sink

3   within the cooling system.

1   5. (Original) The method of claim 1, wherein increasing the operating

2   frequency for the period of limited duration involves increasing the operating

3   frequency for an allotted time.

1   6. (Original) The method of claim 1, wherein increasing the operating

2   frequency for the period of limited duration involves increasing the operating

3   frequency until a command is received to reduce the operating frequency.

1   7. (Original) The method of claim 1, wherein if the thermal energy level of

2   the cooling system is not below the threshold value, the method further comprises

3   increasing the operating frequency of the electronic circuit to the maximum

4   sustainable operating frequency.

1   8. (Original) The method of claim 1, wherein increasing the operating

2   frequency of the electronic circuit additionally involves increasing an operating

3   voltage of the electronic circuit for the period of limited duration.

3

1   9. (Original) The method of claim 1, further comprising, after the period of

2   limited duration is over, lowering the operating frequency of the electronic circuit

3   to the maximum sustainable operating frequency.

1   10. (Original) The method of claim 1, further comprising lowering the

2   operating frequency of the electronic circuit to a lower power-conserving

3   frequency when the electronic circuit is not busy, whereby the lower power-

4   conserving frequency further decreases the thermal energy of the cooling system

5   and thereby provides a longer period of boosted frequency when needed.

1   11. (Currently amended) An apparatus that temporarily increases an

2   operating frequency of an electronic circuit beyond a maximum sustainable

3   operating frequency, comprising:

4   the electronic circuit;

5   a thermal sensor that is configured to determine a thermal energy level of a

6   cooling system for the electronic circuit; and

7   a controller that is configured to receive a request for a higher operating

8   frequency for the electronic circuit from a current sensor within the computer

9   system that is configured to detect an increase in computational workload;

10   wherein if the thermal energy level of the cooling system is below a

11   threshold level for a thermal capacity of the cooling system, the controller is

12   configured to increase the operating frequency of the electronic circuit to a

13   frequency that is greater than the maximum sustainable operating frequency for a

14   period of limited duration;

15   wherein the period of limited duration is short enough to ensure that a

16   temperature increase, caused by increasing the operating frequency, does not raise

17   an operating temperature of the electronic circuit above a maximum operating

18   temperature.

4

1   12. (Original) The apparatus of claim 11, wherein the electronic circuit is a

2   computer system.

1   13. (Currently amended) The apparatus of claim 12, wherein the controller

2   is further configured to receive the request for the higher operating frequency

3   from one of:

4   an application running on the computer system; and

5   an operating system of the computer system.; and

6   a current sensor within the computer system that is configured to detect an

7   increase in computational workload.

1   14. (Original) The apparatus of claim 11, wherein the thermal sensor is

2   configured to measure a temperature of a heat sink within the cooling system.

1   15. (Original) The apparatus of claim 11, wherein the controller is

2   configured to increase the operating frequency by allotting a time for the increase.

1   16. (Original) The apparatus of claim 11, wherein the controller is

2   configured to increase the operating frequency by sending a command to increase

3   the operating frequency, and then later sending a command to decrease the

4   operating frequency.

1   17. (Original) The apparatus of claim 11, wherein if the thermal energy

2   level of the cooling system is not below the threshold value, the controller is

3   configured to increase the operating frequency of the electronic circuit to the

4   maximum sustainable operating frequency.

1   18. (Original) The apparatus of claim 11, wherein the controller is

2   additionally configured to increase an operating voltage of the electronic circuit

3   for the period of limited duration.

1   19. (Original) The apparatus of claim 11, wherein the controller is

2   implemented by code that is executing on a processor.

1   20. (Original) The apparatus of claim 11, wherein the controller is

2   implemented by special purpose digital hardware.

1   21. (Original) The apparatus of claim 11, wherein after the period of

2   limited duration is over, the controller is configured to lower the operating

3   frequency of the electronic circuit to the maximum sustainable operating

4   frequency.

1   22. (Original) The apparatus of claim 11, wherein the controller is

2   configured to lower the operating frequency of the electronic circuit to a lower

3   power-conserving frequency when the electronic circuit is not busy, whereby the

4   lower power-conserving frequency further decreases the thermal energy of the

5   cooling system and thereby provides a longer period of boosted frequency when

6   needed.

1   23. (Currently amended) A computer system that is configured to

2   temporarily increase its operating frequency beyond a maximum sustainable

3   operating frequency, comprising:

4   a processor;

5   a memory;

6   a thermal sensor that is configured to determine a thermal energy level of a

7   cooling system for an electronic circuit in the computer system; and

8   a controller that is configured to receive a request for a higher operating

9   frequency for the electronic circuit from a current sensor within the computer

10   system that is configured to detect an increase in computational workload;

11   wherein if the thermal energy level of the cooling system is below a

12   threshold level for a thermal capacity of the cooling system, the controller is

13   configured to increase the operating frequency of the electronic circuit to a

14   frequency that is greater than the maximum sustainable operating frequency for a

15   period of limited duration;

16   wherein the period of limited duration is short enough to ensure that a

17   temperature increase, caused by increasing the operating frequency, does not raise

18   an operating temperature of the electronic circuit above a maximum operating

19   temperature.

1   24. (Currently amended) A computer-readable storage medium storing

2   instructions that when executed by a computer system cause the computer system

3   to perform a method for temporarily increasing an operating frequency of an

4   electronic circuit beyond a maximum sustainable operating frequency, the method

5   comprising:

6   receiving a request for a higher operating frequency for the electronic

7   circuit from a current sensor within the computer system that is configured to

8   detect an increase in computational workload;

9   determining a thermal energy level of a cooling system for the electronic

10   circuit; and

11   if the thermal energy level is below a threshold level for a thermal capacity

12   of the cooling system, increasing the operating frequency of the electronic circuit

13   to a frequency that is greater than the maximum sustainable operating frequency

14   for a period of limited duration;

15   wherein the period of limited duration is short enough to ensure that a

16   temperature increase, caused by increasing the operating frequency, does not raise

17   an operating temperature of the electronic circuit above a maximum operating

18   temperature.

1   25. (Original) The computer-readable storage medium of claim 24,

2   wherein the electronic circuit is the computer system.

1   26. (Currently amended) The computer-readable storage medium of claim

2   25, ~~wherein~~ the method further comprising receiving the request for the higher

3   operating frequency ~~involves receiving the request~~ from one of:

4   an application running on the computer system; and

5   an operating system of the computer system.~~; and~~

6   ~~a controller that detects an increase in computational workload by~~

7   ~~monitoring a current sensor within the computer system.~~

1   27. (Original) The computer-readable storage medium of claim 24,

2   wherein measuring the thermal energy level of the cooling system involves

3   measuring a temperature of a heat sink within the cooling system.

1   28. (Original) The computer-readable storage medium of claim 24,

2   wherein increasing the operating frequency for the period of limited duration

3   involves increasing the operating frequency for an allotted time.

1   29. (Original) The computer-readable storage medium of claim 24,

2   wherein increasing the operating frequency for the period of limited duration

3   involves increasing the operating frequency until a command is received to reduce

4   the operating frequency.

1   30. (Original) The computer-readable storage medium of claim 24,

2   wherein if the thermal energy level of the cooling system is not below the

3   threshold value, the method further comprises increasing the operating frequency

4   of the electronic circuit to the maximum sustainable operating frequency.

1   31. (Original) The computer-readable storage medium of claim 24,

2   wherein increasing the operating frequency of the electronic circuit additionally

3   involves increasing an operating voltage of the electronic circuit for the period of

4   limited duration.

1   32. (Original) The computer-readable storage medium of claim 24, further

2   comprising, after the period of limited duration is over, lowering the operating

3   frequency of the electronic circuit to the maximum sustainable operating

4   frequency.

1   33. (Original) The computer-readable storage medium of claim 24, further

2   comprising lowering the operating frequency of the electronic circuit to a lower

3   power-conserving frequency when the electronic circuit is not busy, whereby the

4   lower power-conserving frequency further decreases the thermal energy of the

5   cooling system and thereby provides a longer period of boosted frequency when

6   needed.